APPENDIX A. LONG-RUN POLICIES TO REDUCE OIL IMPORTS

In the long run, reducing oil imports and diversifying energy sources are the principal ways to reduce U.S. vulnerability to oil disruptions. Of course, a completed Strategic Petroleum Reserve would also help. Today, oil imports are clearly above the level that correctly balances the economic use of resources with economic vulnerability. Given the limitations on increased domestic oil production, long-term policies to reduce oil imports should encourage conservation and substitution of other energy sources, such as natural gas, coal, and renewable resources.

A previous CBO report spelled out the risks to the United States of dependence on imported oil. 1/ These are future macroeconomic losses as oil prices rise, the possibility of future disruptions in the supply of foreign oil, deterioration in the balance of payments, and constraints on relations with other nations. These risks pose costs that are borne by all U.S. citizens.

To reduce these risks, a number of analysts have suggested the imposition of a long-term oil import tariff, levied to represent the costs of the risks. Since perfect calculation of the risks requires the unobtainable knowledge of future events, setting the precise value of the tariff is impossible. Estimates range between $10 to $30 per barrel.

There are other ways to reduce imports. Some of them, like decontrol of domestic oil prices, have already been implemented. Others, such as utility rate reform to encourage the use of coal by utilities or natural gas deregulation, are available. This appendix, however, focuses on various tariff proposals and their relationship to these other policies.

ECONOMIC EFFECTS OF AN OIL IMPORT TARIFF

Economic Benefits

By raising the price of oil in the United States, an oil import tariff on crude oil and refined products would encourage both conservation (for example, through the purchase of more fuel-efficient cars or by driving less) and substitution of other energy sources (for instance, coal conversions of

1/ The Congressional Budget Office, The World Oil Market in the 1980s: Implications for the United States (May 1980).

industrial boilers). While the demand response to higher oil prices is limited in the short run, the opportunities for conservation and substitution, as the capital stock is replaced, would increase significantly over time.

By decreasing U.S. and, therefore, worldwide demand, the tariff might succeed in lessening some future increases in oil prices. In turn, the inflationary drag of higher oil prices on economic growth would be lower. In addition, some of the revenues that would normally go to foreign oil producers through higher oil prices would be recouped by the tariff and could be used to stimulate the economy. Through reducing U.S. oil imports, a tariff might also lessen somewhat the risks of deterioration in the balance of payments, U.S. vulnerability to oil supply disruptions, and constraints on U.S. foreign policy.

Economic Costs

Because it would raise the price of oil, an import tariff would impose some major costs on the U.S. economy. Aggregate output would decrease, and some economic sectors would be severely affected, notably the automobile and steel industries. Furthermore, a tariff would create shifts in income between producers and consumers and among consumers, and ultimately might not improve the U.S. balance of trade. Some of these costs could be ameliorated through additional policies, but some might have to be accepted in order to obtain the benefits of reduced imports.

Output and Aggregate Income. The higher oil prices induced by a tariff would result in increased unemployment in the short run and lower economic output in the longer term by reducing the amount of goods and services that could be produced profitably. In the shorter run, higher oil prices would also transfer income from the users of oil to oil producers or to the government (through windfall profits tax and tariff receipts), who might not quickly respend this income to purchase goods and services or reduce taxes. Consequently, demand would fall, further reducing income and employment. Furthermore, higher oil prices would increase the demand for money to pay for the oil, and, unless the Federal Reserve allowed the money supply to accommodate this demand, tighter credit and higher interest rates would ensue, restraining both consumption and investment. Oil price increases would also tend to reinforce the inflationary spiral, as people attempted, with varying success, to shift the loss of real income to others. Fiscal and monetary policies could not deal with this increased inflationary pressure without exacerbating the short-run problems described above. Thus, higher energy prices would tend to entrench stagflation in the economy.

Effects on Specific Sectors. The dampening effects of an oil import tariff on economic growth would not be distributed evenly across all sectors of the economy. Higher gasoline prices, for example, would affect automobile sales especially. Although the U.S. automobile industry is shifting to production of smaller, more fuel-efficient cars, its capacity to produce smaller engines and auto bodies will be limited in the next several years. Thus, imposing an oil import tariff in the near future would reduce domestic auto sales as consumers bought more fuel-efficient foreign vehicles. In addition, the reduced income and higher interest rates induced by a tariff would cut into auto sales. Thus, the effects of a tariff on the automobile industry would be sizable.

Other industries would be affected as well. Energy comprises 15 to 20 percent of the final costs of steel production, and the higher energy costs caused by an oil import tariff might be more than the steel industry could pass on to consumers, thus squeezing profits and, presumably, investment in that industry. Other energy-intensive industries that could be similarly affected include paper, chemicals, refining and cement.

The petrochemical industry, which relies heavily on oil as a feedstock for production of its final product, is particularly vulnerable to higher oil prices. In recent years, U.S. petrochemicals have been exported successfully, to a large extent because of the subsidy afforded this industry by domestic oil and gas price controls. By adding to the cost of petrochemical feedstocks, an oil import tariff might reduce, or even destroy, the competitiveness of U.S. petrochemicals in international trade, particularly since oil price decontrol is completed and if natural gas deregulation takes place. If an oil import tariff is implemented, policymakers would have to consider whether or not to allow some exclusion for the oil used by the petrochemical industry.

The sizable effects of an oil import tariff on specific industries suggest that such a tariff might best be phased in in accordance with these industries' abilities to accommodate its effects. By announcing its intention to raise oil prices over time in a series of steps, the government could create an expectation of higher prices that would induce these industries to begin an adjustment in their products and processes before the higher prices were implemented. This would also mitigate many of the adjustment effects across the economy.

Income Distribution. The imposition of an oil import tariff would lead to several significant income transfers. First, presuming a $20 tariff level, the federal government would collect approximately $45 billion per year at current import levels. These receipts could be rebated to households through adjustments in income tax withholding and transfer payments,

although it would be difficult to devise a rebate system to reach every household. Second, since the imposition of an oil import tariff would raise the price of domestically produced oil and oil substitutes, such as some natural gas and coal, domestic energy producers would receive higher revenues. Unless all domestic energy products were additionally taxed or their prices controlled, an income transfer larger than $50 billion per year would result. It should be noted, however, that the windfall profits and corporate income taxes would collect the bulk of the extra revenues realized by domestic oil producers for potential recycling to consumers. A far smaller portion of the windfall realized by natural gas and coal producers would be recycled through current taxes.

Balance of Trade. An oil import tariff would have mixed effects on the U.S. balance of trade. Certainly, the imposition of a tariff would reduce the outflow of dollars in payment for oil, and would therefore strengthen the dollar. But an import tariff could have a negative effect on U.S. exports. By subjecting U.S. industries to higher energy costs than their foreign competitors, a tariff might reduce their competitiveness in world markets. Although a tax credit could be devised to offset increased energy costs for firms producing exports, it would be extremely difficult to administer equitably and efficiently. Given the uncertainty surrounding the effect of higher energy prices on the competitive position of U.S. exports, it is unclear whether an oil import tariff would significantly improve the U.S. balance of trade.

Factors Affecting the Relative Costs and Benefits of Oil Import Tariffs

As the above discussion has indicated, an oil import tariff would allow the United States to reduce oil imports, but only by imposing economic costs. But no long-term reduction in U.S. oil imports can be achieved without paying some price. The size of the cost, however, might be affected by several factors, among them the efficiency with which the economy responds to an oil import tariff, the reaction of producing nations, and whether or not the tariff is multilaterally imposed.

Economic Responsiveness. The same inefficiencies impede the responsiveness of the economy to higher energy prices whether they result from an oil import tariff or other causes. These inefficiencies include reduced investment because of high interest rates generated by inflation, an inappropriate level of conservation measures caused by the relatively rapid turnover in residences and commercial structures, and regulatory biases that induce uneconomic fuel use. Inasmuch as these imperfections were corrected, the responsiveness to any oil price increase would improve, and the relative advantages of an oil import tariff would be substantially increased.

Producer Response. To the extent that world oil prices would fall in response to reduced U.S. imports caused by an oil import tariff, the benefits of a tariff would increase. Should foreign producers curtail output sufficiently to maintain the world market price of oil, then the entire tariff would be borne by U.S. consumers, and prices would increase by an amount equal to the tariff. If, however, producing nations were unwilling to cut back output that much, a market glut could result, and producer prices would fall somewhat. Rather than an actual price decline, the slackened market might be reflected in a reduced rate of price increases. Reducing the world price through the tariff would redistribute income significantly from foreign producers to domestic consumers, since the dollar outflow for oil would be reduced, and government tariff receipts could be recycled into the economy. Thus, the relative benefits of an import tariff would increase to the extent that foreign producers moderated any production cutbacks.

A Multilateral Tariff. The U.S. benefits of a tariff would also be increased if it were imposed multilaterally by the major consuming nations. Joint imposition would increase the tariff's downward pressure on world oil prices by creating a larger world surplus. In addition, a multilateral tariff could eliminate the competitive disadvantage of U.S. exports created by a unilateral tax.

EFFECTIVENESS OF OIL IMPORT TARIFFS RELATIVE TO OTHER OIL IMPORT POLICIES

An import tariff might be most appropriate after implementation of all conservation and substitution policies that are economic at the current world oil price. This is a reflection of the fact that these policies carry a lower resource cost than those necessitating higher oil prices.

Although natural gas prices are being raised gradually to oil-equivalent prices under the Natural Gas Policy Act, controls still provide a subsidy to consumers. Accelerating the movement toward gas decontrol might, therefore, be preferable to higher oil prices. Similarly, eliminating the current regulatory bias against new coal-fired capacity in electric utilities could reduce oil imports by up to 500,000 barrels per day within a few years without major economic costs. This policy would be preferable to oil import tariffs in overall effectiveness, although joint implementation would result in greater import reduction than would be obtained from either option alone.

Although there are other tax options, such as taxing gasoline or all transportation fuel, these appear to be less preferable than oil import fees on both efficiency and administrative grounds. Directing the entire burden

to gasoline would preempt any other reductions in the use of oil. By decreasing the efficiency with which higher oil prices force conservation and substitution of other fuels, a gasoline tax would result in a more difficult economic adjustment to higher oil prices than is necessary.

It should also be noted that the imposition of an oil import tariff might accelerate the production of unconventional sources of energy. Synthetic liquid fuels and renewable resources are particularly promising in this regard. By raising the price that consumers pay for energy, an oil import tariff would make both of these types of energy more competitive. By allowing the higher price created by the tariff to accrue to producers of synthetic fuels, an oil import tariff could act like a price guarantee for such energy production. If a tariff raised the price of energy to the point at which synthetic liquid energy became competitive, the tariff should be viewed as an effective substitute for many of the financial subsidies now being considered for the synthetic fuels industry.

APPENDIX B. ALLOCATION OF CRUDE OIL AMONG REFINERS DURING OIL DISRUPTIONS

The main body of this paper analyzed three alternative approaches that the Congress might consider in preparing the nation for a future disruption in supplies of imported oil:

- A neutral policy based largely on authorities that would remain after the expiration of the Emergency Petroleum Allocation Act (EPAA) and that would rely on market allocation of crude oil and products;
- A tax-based policy that would attempt to retain and recycle the income that would otherwise flow to foreign and domestic oil producers; and
- A rationing policy derived from the position originally taken in EPAA.

If the third of these approaches was adopted, the Congress would need to consider standby authority for the allocation of crude oil among domestic refiners in the event of an oil disruption. This is because the wellhead price controls on domestic crude oil inherent in rationing implies that some refiners would have access to price-controlled domestic oil, while others would be forced to buy imported oil at the world price. In the absence of a program to allocate the benefits of lower-priced domestic crude among refiners, some would reap large profits, while others would experience large losses.

Even without wellhead price controls associated with the rationing option, some refiners, and perhaps their customers, might be at a disadvantage during an oil disruption. Thus, the issue of allocating crude oil among refiners is present in all three approaches.

The federal government has had the authority to allocate crude oil since 1973, under the EPAA which expires September 30, 1981. After this date, the President has the authority, under Section 251 of the Energy Policy and Conservation Act (EPCA), to allocate crude oil only to implement the obligations of the United States under agreements with the International Energy Agency (IEA). According to these agreements, a

shortfall in any member nation exceeding 7 percent of historical consumption would trigger the international allocation program.

The issue before the Congress is whether standby authority to allocate crude oil beyond that granted by EPCA ought to be provided to the President. This appendix considers the issue in view of four goals for an effective allocation program:

- o Increase U.S. preparedness prior to a disruption;
- o Produce and distribute efficiently the right mix of products;
- o Keep refiners out of the spot market to minimize panic buying during disruptions; and
- o Distribute the burden of a disruption equitably.

The next four sections of the paper compare the ability of two policy alternatives to satisfy these goals: a crude oil allocation program and market allocation of crude oil. The final section discusses a series of decisions relating to the establishment of an allocation program and the Congressional debate over the extension of the EPAA.

INCREASE PREPAREDNESS FOR A DISRUPTION

There are two key factors that influence U.S. preparedness for oil import disruptions: the level of oil stockpiles and the degree of diversification of sources of supply. Expectations regarding the way in which crude oil would be allocated during a disruption would affect both of these factors.

The Importance of Stockpiles and Diversification for Preparedness

Petroleum stockpiles are probably the most effective means to reduce the adverse effects of an oil supply disruption. Previous CBO work has indicated that each barrel of Strategic Petroleum Reserve (SPR) oil could avert about $200 of potential GNP loss in the event of a year-long supply interruption in 1984. 1/ The current SPR stockpile of about 180 million

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1/ See Congressional Budget Office, An Evaluation of the Strategic Petroleum Reserve (June 1980) and Financing Options for the Strategic Petroleum Reserve (April 1981).

barrels is only 18 percent of the 1 billion barrel reserve authorized by the Congress. While the SPR is being filled, private stockpiles play an essential role in providing some interim protection against the adverse effects of an oil supply disruption. Once the SPR is in place, they still might have use as a complement to the government reserve. Thus, any effect that a mandatory crude oil sharing program would have on incentives for private stockpiling could be very important.

Diversification of oil supply sources could also affect preparedness. The security of U.S. imported oil supplies would be enhanced to the extent that the nation began to import more from countries currently exporting little oil to the United States while importing less oil from present major suppliers. 2/

The Importance of Expectations

Government allocation of crude oil would create two categories of refiners: those who would be required to sell to other refiners, and those who would buy from other refiners. Of concern is how the imposition of crude oil allocation would affect the behavior of these two classes of refiners prior to the disruption. Since the focus is on behavior prior to the disruption, the refiner's expectation of his category--either buyer or seller--is the important consideration.

The refiner's expectation could be formed in a number of ways. If the sharing rule for allocation was not determined prior to the disruption, then past allocation rules or other evidence might influence his expectations. Alternatively, the sharing rule might specify who would be a buyer or seller. For example, a rule could define buyers and sellers using such criteria as size and storage capacities, sources of foreign and domestic oil, or whether the refinery was part of an integrated operation. For example, during some parts of the buy-sell program that existed under petroleum price controls from 1974 to 1981, buyers had to be small or independent refiners whereas sellers were limited to the 15 largest refiners.

Any business will, of course, attempt to avoid and insure against "stockouts," or shortages of raw materials. This is especially true in an industry like refining, which has high fixed costs that continue whether or

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2/ For more detail about the prospects of developing new sources, see Congressional Budget Office, The World Oil Market in the 1980s: Implications for the United States (May 1980).

not the refinery is operating. In fact, a number of institutional features of the oil industry, such as crude stockpiles, vertical integration, multiple sources of supply, and a mix of short- and long-term oil supply contracts, can be explained as insurance activities that attempt to exercise some control over the availability of crude oil. 3/

Refiners Who Expect to Receive Crude. Government allocation would constitute a substitute form of insurance for firms against the competitive disadvantage arising from a disruption-induced shortage of crude. Thus refiners who expect to receive crude oil under a government allocation program during disruptions would have less incentive to diversify their sources of supply and stockpile oil than if no allocation occurred.

Refiners Who Expect to Give Crude. The effect of government allocation on the diversification and stockpiling activities of refiners who expect to give crude would depend on the nature of the allocation program. In general, allocation rules in which the amount supplied is constant in all circumstances might increase incentives for diversification and stockpiling by firms giving oil. One example of such a procedure would be to assign each major refiner a predetermined amount of oil as a standby obligation to other refiners under an emergency allocation program. Faced with such an allocation procedure, a major refiner might secure more oil in advance. This positive incentive could occur because once major refiners have stockpiled their standby obligations, they would retain the benefits from every additional barrel of inventories.

On the other hand, diversification and stockpiling activities of firms giving up oil might be decreased by allocation rules in which the amount supplied depended on the extent of diversification and stockpiling. For example, if refiners giving oil would have to give up any oil beyond the amount they held in a base period, if refiners had to share some portion of each barrel in inventory, or if allocation would equalize the capacity utilization rates of all refiners, then incentives to stockpile or diversify after the base period would be considerably reduced, since some of the additional oil obtained might have to be sold to other refiners during a disruption.

3/ A vertically integrated oil company controls several, if not all, stages of oil production, refining, and selling. Such a firm contrasts with an independent refiner who has to contract for crude and arrange for sales to retailers. For a more detailed discussion of vertical integration, see David J. Teece, Vertical Integration and Vertical Divestiture in the U.S. Oil Industry, Institute for Energy Studies, Stanford University (1976).

It is, therefore, theoretically possible to design allocation rules that would increase the diversification and stockpiling activities of firms giving oil, provided that recipients and donors are defined in advance. Furthermore, these rules could be designed so that the increased activities of these firms would more than outweigh any reduced diversification and stockpiling activities of firms receiving oil.

In practice, however, these rules would be very difficult to implement. What would the government do about refiners who had been designated to give up oil if their crude supplies had been reduced or cut off? As it became apparent over time that the sellers list was out-of-date, what would the government do with the predesignated selling refiners who no longer had the best access to crude oil? If refiners believed that the government would amend its allocation procedures in these or other circumstances, the incentive to diversify or add to inventories might be blunted. Faced with an uncertain allocation rule, all refiners might reduce their inventories in order to reduce their potential sharing obligations.

Finally, rules with preassigned sharing obligations based on the size of the refinery would encourage the construction of smaller refineries or would reduce competition. To avoid this bias toward constructing smaller refineries, an exemption could be established denying new small refiners the right to buy. While such a rule would not encourage the construction of new small refineries, it would tend to be anticompetitive in that benefits would be conferred on existing firms that would not be available to new entrants.

PRODUCE AND DISTRIBUTE PRODUCTS EFFICIENTLY

During an oil emergency, the most useful product mix of refineries might differ from that of normal periods. There would be uncertainty about which uses of petroleum products would be reduced more than others through the availability of substitutes (such as coal or natural gas for residual fuel oil), government regulation (for example, mandatory Sunday closing of gasoline stations), or other factors. Although the precise changes in the required product slate of refiners would be difficult to predict, the desired product mix might be substantially different from normal output, both nationally and regionally.

At the other end of the refining process, the mix of crude input would probably be altered also, since a disruption would likely be centered in a nation or region with disproportionate production of one type of crude. Thus, oil supply disruptions would change the physical characteristics, such as the weight and sulfur content, of crude oil used in refining.

Matching these different crude inputs and products slates would greatly complicate the task of an allocation program. It would not be enough merely to attempt simply to prorate available supplies based on the market allocation of some prior period. Because of the changes in input/output mix, adjustments among refiners would have to match the resulting crude supplies and the demand for products. But even such a rebalancing of crude inputs and outputs probably would not be efficient since it might be cheaper to shut down some refineries entirely rather than to operate all plants at a reduced rate of capacity utilization. This preference has been observed recently in refinery closings by major multi-plant refiners. A recent National Petroleum Council report states that in a major crude oil curtailment ". . . extended shut-down of unutilized capacity may be more practical, economical, and energy efficient than attempting to operate all units at reduced throughputs." 4/

If a government allocation program is to replace a market system effectively, it must have access to a great deal of current information about crude oil supply, the processing capabilities of refineries, and demand for products. The timely acquisition of such information is likely to be a significant administrative barrier. The history of government allocation of petroleum in recent years suggests that, in the absence of these data, government allocation would probably exacerbate problems during a disruption. For example, areas with larger discretionary demand had sufficient gasoline during previous disruptions, while long lines occurred in other places. To be sure, these effects were often the result of price and allocation controls on refined products, rather than allocation of crude oil among refiners. Nevertheless, the administrative difficulties they suggest could also apply to government allocation of crude oil. This implies that government allocation might not improve circumstances for consumers and could easily create the very situation it seeks to avoid: a physical shortage of petroleum products.

KEEP REFINERS FROM BUYING ON THE SPOT MARKET

It is commonly suggested that government allocation of crude oil would keep crude-deficient refiners from buying on the spot market. With lower demand for spot oil, spot prices would fall. Since spot prices often serve as price indicators to the Organization of Petroleum Exporting

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4/ National Petroleum Council, Emergency Preparedness for Interruption of Petroleum Imports into the United States (April 1981), p. 23.

Countries (OPEC), it is further asserted that keeping some refiners out of the spot market would not only lower spot prices, but future contract prices as well. This argument vastly oversimplifies the effect of government allocation, however.

Government crude oil allocation would have uncertain effects on spot purchases during a disruption. If the government allocation program reduced the size of the desired stockpile before the disruption, it would also reduce the size of the desired stockpile during a disruption. From these suppositions alone, however, it is difficult to infer anything about the effect of government allocation on spot purchases. Spot purchases reflect, among other things, changes in the level of stockpiles, not the size of the stockpile at any one time. A government allocation program that reduced the size of stockpiles before and during the disruption might not affect the change in the level of the stockpile resulting from the disruption and hence might not increase the level of spot purchases during a disruption.

DISTRIBUTE THE BURDEN OF THE DISRUPTION EQUITABLY

The effect of an allocation program would depend on how the initial allocation of crude oil was translated into a distribution of products to consumers. If shortages of crude oil to particular refiners translated into shortages to the ultimate consumers of these refineries' products, then particular regions of the country or particular users of petroleum products might be disproportionately affected.

One view of this process is that the initial allocation of crude oil determines the allocation of product. For example, if consumers relied on a refiner whose output would be eliminated or curtailed because of lack of crude, then those consumers would bear the brunt of the shortfall. According to this view, refiners with crude would supply only their traditional customers in order to maintain goodwill and fulfill contracts, leaving customers of crude-deficient refiners without access to petroleum products. Indeed, the Uniform Commercial Code "requires a seller to fulfill contractual commitments to existing customers before seeking new business or taking on new customers that may have been served by other sellers. In a severe supply disruption, even those refiners whose crude oil access has not been significantly affected may have only sufficient supplies to meet contractual commitments to their existing customers." 5/

5/ National Petroleum Council, Emergency Preparedness, p. 31.

The opposing view is that the market would allocate resources relatively efficiently, and that existing business relationships and the requirements of contract law would not impede this allocation process. Although the cost of some transactions might prevent a perfect allocation process, the limited supply of products would generally flow to the most highly valued users. The principal concern with this view is whether the time required to establish new, market-based patterns of distribution would be sufficient to cause undue hardship for some oil users.

These two views represent different conceptions about the effect of formal and informal rights to receive oil, as embodied in contracts and existing business relationships, on the ultimate distribution of product. The latter view might be more correct because it recognizes that these rights could be traded effectively in a number of ways. For example, refiners and their existing customers could renegotiate their existing contracts so as to reduce the delivery of product. Or, large customers might continue to receive the historical amount of product, but to resell the product to those without it. In either event, the customer could maximize his profit by reducing the volume of product consumed or stockpiled, thus freeing up product for customers historically served by crude-short refiners.

With regard to oil users, a market system would be the least costly way to reallocate crude oil during a disruption. If special assistance to certain customers was desired, then direct government subsidies or product set-asides for these purchases could be employed. Some customers or regions might suffer hardship during the time required for a workable market to become established, however. This hardship might befall these customers even with a government allocation system, if the government system was not established quickly. It would require a great deal of preplanning and continual, close monitoring of the flow of crude oil through the economy for a government program to be superior in this respect.

With regard to refiners, government allocation would benefit small and independent refiners, who generally would experience cutoffs during supply disruptions. If price controls were applied to domestic crude, those refiners without access to controlled oil would be at a further disadvantage. Mandatory allocation would mitigate these problems by spreading the burden among all refiners.

SUMMARY OF ANALYSIS

The preceding analysis suggests that government allocation of crude oil might be a relative weak tool to offset the adverse effects of an oil

disruption. A summary of the analysis with respect to the four evaluation criteria follows:

- o Preparedness for Disruption. Some allocation plans would increase preparedness while others would decrease it. Allocation plans, which could potentially increase preparedness, would do so only if they were credible and realistic.

- o Produce and Distribute Products Efficiently. Allocation tends to reduce the efficiency of both the production and distribution of crude oil products.

- o Keep Refiners Out of the Spot Market. Although allocation might affect the level of stockpiles before and during a disruption, the net effect on spot purchases is difficult to determine.

- o Distribute the Burden Fairly. There is little apparent distinction in terms of effect on oil users between government allocation and market allocation of crude oil. Market allocation would concentrate the burden on particular refiners while government allocation would spread the burden among refiners. The time required to establish a workable market or government allocation program might cause temporary hardship in some areas.

POLICY CONSIDERATIONS IN DESIGNING AN ALLOCATION PROGRAM

If there was a standby crude oil allocation program, its design would require a series of decisions about the specific features of such a program. These specific features, which would largely determine the success or failure of such programs, include:

- o Physical allocation of crude versus an entitlement to purchase oil;

- o Price of allocated oil;

- o Sharing rule;

- o Size of disruption required to trigger allocation programs; and

- o Certainty of allocation.

Physical Allocation of Oil versus Entitlements

The effect of oil allocation during disruptions would depend critically on whether crude oil was physically allocated and transported or whether only the "right" to buy oil was allocated. Under the EPCA oil price control program, the entitlements program allocated rights to buy oil, and differences between these rights and the oil actually delivered were resolved by payments among refiners. Similarly, the National Petroleum Council proposal for an allocation program involves marketable rights to buy oil as long as sellers of rights can continue to supply their customers. 6/ Allocation of rights would appear to be superior to plans that involve the physical allocation of oil. Allocation of rights would provide equity among refiners as would all allocation plans, but it would not reduce the ability of refiners to produce and distribute products as long as transactions regarding sale of rights could be made easily. The major disadvantage of allocation of rights would be that the incentives for preparedness would be identical to physical allocation plans, and thus might be inferior in most instances to the incentives under market allocation.

Price of Allocated Oil

The price of allocated oil would affect the volumes of oil allocated and the incentives of refiners receiving and giving the oil. The effect on the volume would result simply because crude oil allocation would occur at the option of the receiving refiner. The more favorable the terms to the receiving refiner, the larger the allocation he would seek and the larger the incentive effects on the receiving refiner and the refiner giving the oil. Setting the price at marginal or replacement cost would allow the selling refiner to pass through the total cost of the oil to the buying refiner. This would tend to eliminate the incentives of the selling refiner to negotiate a low price when he purchases the oil originally.

Selling at marginal cost would also fail to assist the buying refiner, who presumably could purchase oil on the world market at the same price. Setting the price below the marginal cost of crude to the selling refiner, on the other hand, would result in a subsidy from the selling refiner to the buying refiner. Allocation at average costs, such as the average cost of all crude oil to the selling refiner, could result in a significant subsidy since the marginal cost (the cost of spot crude) would probably be much higher than the average cost during a disruption.

6/ National Petroleum Council, Emergency Preparedness.

Sharing Rule

Several types of sharing rules are available. In general, rules fall into two categories:

- Those for which the name of each selling refiner and quantity obligated would be known prior to the disruption; and

- Those for which the identity and sales obligation of sellers would not be known until the disruption, and might depend on these refiners' stockpiles, crude oil deliveries, size, or other variable and uncertain factors.

If preparedness were the major criterion, then allocation rules in which the refiner would have a fixed potential sharing obligation would be highly preferable to rules in which the allocated amount was based on crude oil stockpiles or deliveries or on capacity utilization. Similar considerations would apply to the rule specifying the amount that each eligible refiner could buy. To the extent that this amount was independent of the current deliveries and stockpiles of the buying refiner, incentives for proper diversification and stockpiling would be maintained.

Thus, it is not possible to generalize that government-mandated crude oil allocation would make the United States better or worse prepared for a supply disruption. Evaluated strictly in terms of preparation for a supply disruption, the sharing rules can be arrayed in descending level of preparedness:

- Allocation rules with fixed standby selling obligations and purchasing opportunities (assuming they could be made credible);

- Market allocation;

- Sale of SPR oil to eligible refiners; and

- Allocation rules in which obligations to sell or opportunities to buy would depend strongly on stockpiling, deliveries to refiners, or capacity utilization rates.

Other evaluation criteria, such as cost or fairness, might lead to a different ranking, however. Allocation rules that would encourage some refiners to stockpile and diversify sources of supply more than they would under other alternatives would increase the costs of those refiners. If the goal was to increase preparedness, increasing stockpiles of SPR oil might be a cheaper form of storage than would be available to refiners. Alternatively, the government could require refiners and importers to store oil as

an Industrial Petroleum Reserve (IPR). The Energy Policy and Conservation Act (EPCA) gives the Secretary of Energy the discretionary authority to require petroleum refiners and importers to store as an IPR up to 3 percent of the oil passing through their facilities. This authority expires June 30, 1985. 7/ The issue is whether the potential gain in preparedness resulting from a credible allocation procedure would be cost-effective and would result in an equitable distribution of costs, when compared to an option such as increased SPR storage or an IPR.

Size of Disruption

The size of the disruption is an important determinant of whether government should intervene in the market. Government intervention would involve administrative costs that would not vary greatly with the size of the disruption. Furthermore, market forces are often judged to be adequate to deal with minor changes but are considered less reliable for large disruptions. For both of the reasons, government intervention is often suggested for large disruptions whereas market forces are suggested for small disruptions. The discussion of tax, tariff, and rationing options in the body of the paper is one example of such an analysis.

Such an approach has also been suggested for government allocation of crude oil. For example, the National Petroleum Council recommended allocation for large disruptions and market allocation for small disruptions. The analysis in this appendix, however, does not support a distinction between the policies suitable for small and large disruptions. Market forces to allocate crude oil do not appear to "break down" as the disruption size increases.

Certainty of Allocation

If the nature of the allocation was uncertain, refiners would act according to what they expected government policy would be but would protect themselves against the uncertainty. Congressional action to lessen this uncertainty would be beneficial as long as the indicated policy did not produce worse incentives than the policy refiners would expect in the absence of Congressional action. Thus, if the Congress decided to grant the President standby authority to impose allocation of crude oil, specification of the nature of the permitted allocation program could yield significant benefits.

7/ For more detail, see Congressional Budget Office, Financing Options for the Strategic Petroleum Reserve.